Figure 1

100

VIDEO 1

VIDEO 2

VIDEO 3

VIDEO 10

SOURCE AUDIO — SA

DATA

PID ASSIGNMENT

RTE_1 — 220-1 — $E1$
RTE_2 — 220-2 — $E2$
RTE_3 — 220-3 — $E3$
RTE_{10} — 220-10 — $E10$
$RTEA$ — 220-A — EA

AUDIO DELAY — 270 — SD

DATA PROCESSOR — 280 — SD'

ENCODING PROFILE AND CLOCK GENERATOR — 202

PICTURE ISOLATOR — 230-1
PICTURE ISOLATOR 2 — 230-2
PICTURE ISOLATOR — 230-3
PICTURE ISOLATOR — 230-10

I_1 ... I_2 ... I_3 ... $I10$

PRED

$PACKET_1$ — 240-1 — PID1
$PACKET_2$ — 240-2 — PID2
$PACKET_3$ — 240-3 — PID3
$PACKET_4$ — 40-4 — PID4
$PACKET_{11}$ — 240-11 — PID11
$PACKET_{12}$ — 240-12 — PID12
$PACKET_{13}$ — 240-13 — PID13

BUF_1 — 250-1
BUF_2 — 250-2
BUF_3 — 250-3
BUF_4 — 250-4
BUF_{11} — 250-11
BUF_{12} — 250-12
BUF_{13} — 250-13

MULTIPLEXOR — 260 — TOUT

V1 V2 V3 V10 ...10

Figure 2

START ~305

WAIT FOR SEQUENCE
HEADER OR GROUP START CODE ~310

ACCEPT ALL DATA UNTIL
SECOND PICTURE START CODE ~315

COUPLE ACCEPTED DATA TO
I-PICTURE OUTPUT ~320

PROCESS
NON-I-PICTURE
DATA
? ~325

NO

YES ~330

ACCEPT ACCESS UNIT DATA
ASSOCIATED WITH SECOND
PICTURE AND ALL SUBSEQUENT
PICTURES THROUGH LAST
PICTURE IN GROUP

COUPLE ACCEPTED DATA TO
NON-I-PICTURE OUTPUT ~335

Figure 3

Figure 4

START

END

400 401 402 403 404 405 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425

423 424 425

| ... | P₁ | B₁ | D₁₃ | A₁₂ | I₁₁ | I₁₀ | ... | I₅ | I₄ | I₃ | I₂ | B₁ | B₁ | P₁ | B₁ | B₁ | P₁ | B₁ | B₁ | P₁ | B₁ | ... |

Figure 5

START — 605

WAIT FOR DESIRED I-STREAM PID — 610

EXTRACT PACKETS OF DESIRED I-STREAM PID — 615

COUPLE PAYLOAD'S OF DESIRED I-STREAM PACKETS TO VIDEO DECODER — 620

EXTRACT PACKETS OF PREDICTED PICTURE STREAM PID — 625

COUPLE PAYLOAD'S OF PREDICTED PICTURE STREAM PACKETS TO VIDEO DECODER — 630

SELECT A DIFFERENT I-PICTURE STREAM? — 635
NO
YES

IDENTIFY PID OF NEW DESIRED I-PICTURE — 640

600

Figure 6

START — 705

WAIT FOR
DESIRED I-STREAM — 710
PID

RE-MAP THE PID — 715
OF I-STREAM TO
A PREDETERMINED
PID*.

RE-MAP THE PID — 720
OF PRED-STREAM
TO . PID*

EXTRACT PACKETS — 725
OF PID* STREAM

COUPLE PAYLOADS .730
OF PID* STREAM
TO
VIDEO DECODER

SELECT — 735
A DIFFERENT   NO
I-PICTURE
STREAM
?

YES — 740

IDENTIFY PID OF
NEW DESIRED
I-PICTURE

) 700

Figure 7

START — 805

WAIT FOR
DESIRED I-STREAM — 810
PIO

EXTRACT PACKETS
OF DESIRED
I-STREAM — 815
UNTIL
"0" SPLICE COUNTDOWN
PACKET (INCLUDING)

COUPLE PAYLOAD'S — 820
OF DESIRED I-STREAM
PACKETS TO
VIDEO DECODER

RE-PROGRAM PID — 825
FILTER TO RECEIVE
PRED - STREAM.

EXTRACT PACKETS — 830
OF PRED - STREAM
UNTIL
"0" SPLICE COUNTDOWN
PACKET (INCLUDING)

COUPLE PAYLOAD'S — 835
OF PRED-STREAM
PACKETS TO VIDEO
DECODER

SELECT
A DIFFERENT — 840
I-PICTURE
STREAM
?

NO → RE-PROGRAM PID — 850
FILTER TO RECEIVE
I-STREAM PID

YES — 845

IDENTIFY PID OF
NEW DESIRED
I-PICTURE

800

Figure 8

Figure 9

8:00　8:30　9:00　Tu 9:30P

905A　905B　905C　931 932 934 935 936 937 938 933

FAVES MOVIES KIDS SPORTS VIDEO ON DEMAND

8:04　739

		8:00	8:30	9:00
910-1	1 ABC	OPRAH WINFREY	DREW CAREY	NEWS
910-2	2 AMC	HAPPY TRAILS: ROY ROGERS	HAPPY TRAILS: ROY ROGERS	HAPPY TRAILS: ROY ROGERS
910-3	3 BRVO	SOUTH BANK SHOW	SOUTH BANK SHOW	INSIDE THE ACTORS STUDIO
910-4	4 CBS	60 MINUTES II	60 MINUTES II	NEWS
910-5	5 CNN	HEADLINE NEWS	WORLD NEWS	CROSSFIRE
910-6	6 COM	BIG SHOTS: ELLEN DEGENERES	BIG SHOTS: ELLEN DEGENERES	MARRIED TO THE MOB
910-7	7 DISC	WILD DISCOVERY	WILD DISCOVERY	GIMME SHELTER
910-8	8 ESPN	BASEBALL TONIGHT	BASEBALL TONIGHT	BASEBALL TONIGHT

941A

941B

VIDEO HERE (WITH SOUND)　920

SMART CABLE COMPANY　715

Roy Rogers goes hunting for the Bad Guys
Start-8pm, Ends-9:30pm
Length(1:30) Rated TV-G　750

911H　902　901　700

Figure 9

SLICE 1 (g/s1)	SLICE 1 (v/s1)
SLICE2 (g/s2)	SLICE2 (v/s2)
.	.
:	:
.	:
SLICE N (g/sN)	SLICE N (v/sN)

900

902

901

FIGURE 9A

9:30 10:00 10:30 Tu 11:30P ★ FAVES FAVES KIDS SPORTS [M] ☒ VIDEO ON DEMAND

1034'

8:04

		9:30	10:00	10:30
1	ABC	DHARMA & GREG	IT'S LIKE YOU KNOW	NEWS
2	AMC	PATTON	PATTON	PATTON
3	BRVO	ROSA LUXEMBERG	ROSA LUXEMBERG	ROSA LUXEMBERG
4	CBS	PAYNE ROYAL	NANNY	60 MINUTES II
5	CNN	SPORTS TONIGHT	MONEY LINE	LARRY KING LIVE
6	COM	SINBAD: BRAIN DAMAGE	SINBAD: BRAIN DAMAGE	COMICS COME HOME
7	DISC	SCIENCE OF MAGIC	SCIENCE OF MAGIC	DISCOVER MAGAZINE
8	ESPN	SPORTS CENTER	SPORTS CENTER	BASEBALL TONIGHT

VIDEO HERE

SMART CABLE COMPANY

PATTON, GEORGE C SCOTT, KARL MALDEN
Start-9:30p, Ends-11:00p
Length(1:30) Rated TV-PG

1020

1002

1000

Figure 10

| PID1 | PID2 | PID3 | ... | PID10 | ~ h |

1102 1132 1134 1148

| g1 | v1 | | g2 | v1 | | g3 | v1 | ... | g10 | v1 | ~ row-1 |

1104

| g1 | v2 | | g2 | v2 | | g3 | v2 | ... | g10 | v2 | ~ row-2 |

1106

| g1 | v3 | | g2 | v3 | | g3 | v3 | ... | g10 | v3 | ~ row-3 |

1130

| g1 | v15 | | g2 | v15 | | g3 | v15 | ... | g10 | v15 | ~ row-15 |

column-2   column-2   column-3   column-10

1100

Figure 11

Figure 12

HEAD END EQUIPMENT (HEE)

AUDIO SOURCE — 1312

VIDEO SOURCE — 1314

ENCODING UNIT — 1316

CABLE MODEM — 1322

GUIDE DATA SOURCE — 1332

1302

1330 — TO OTHER LNEs

1328 — LOCAL Neighborhood Equipmt

1300

1304 — DISTRIBUTION NETWORK

1306₁ — SUBSCRIBER EQUIPMENT (SE)

RECEIVER — 1324

DISPLAY — 1326

1306₂ — SE

1306ₙ — SE

1306

Figure 13

1316

VIDEO PROCESSOR — 1400

1408

ENCODER UNIT

VIDEO — 1410

AUDIO — 412

COMPOSITOR UNIT — 1406

VIDEO

AUDIO

TO CABLE MODEM 1322

CONTROLLER — 1404

GRAPHICS PROCESSOR — 1402

GUIDE DATA

GUIDE DATA GRID GENERATOR — 1414

GUIDE ENCODER — 1416

SLICE-FORM GRID PAGE DATABASE — 1418

FIGURE 14

1328

FROM
HEE
1302

$\rightarrow$ | CABLE MODEM | 1500

$\rightarrow$ | SLICE COMBINER | 1502

$\rightarrow$ | MULTIPLEXER | 1504

$\downarrow$

| DIGITAL VIDEO MODULATOR | 1506

$\downarrow$

TO
DISTRIBUTION
NETWORK
1304

FIGURE 15

PIo Dimension

Time Dimension

PID1   PID2   PID3   PID10   PID11

t1 | g1 | v1 | | g2 | v1 | | g3 | v1 | ... | g10 | v1 | ← Intra-Coded Slices

t2 | g1 | v2 | | g2 | v2 | | g3 | v2 | ... | g10 | v2 |

t3 | g1 | v3 | | g2 | v3 | | g3 | v3 | ... | g10 | v3 |

t15 | g1 | v15 | | g2 | v15 | | g3 | v15 | ... | g10 | v15 |

PID1   PID11

Predictive - Coded Slices

1600

Figure 16

(a)

IPG Page-1 — 1702₁   IPG Page-2 — 1702₂   IPG Page-10 — 1702,₁₀

1702

1704₁   1704₂   1704₃

g_1/s_1	V/s_1
g_1/s_2	V/s_2
⋮	⋮
g_1/s_N	V/s_N

g_2/s_1	V/s_1
g_2/s_2	V/s_2
g_2/s_N	V/s_N

g_{10}/s_1	V/s_1
g_{10}/s_2	V/s_2
⋮	⋮
g_{10}/s_N	V/s_N

← time t_1 intra-coded slices

1704

Scanning from Left to Right each slice $s_1, s_2, \cdots s_N$

(b)

PID1   PID2   PID10   PID11

| g_1/s_1 | g_2/s_1 | ⋯ | g_{10}/s_1 | V/s_1 |

PID1   PID2   PID10   PID11

| g_1/s_2 | g_2/s_2 | ⋯ | g_{10}/s_2 | V/s_2 |

PID1   PID2   PID10   PID11

| g_1/s_N | g_2/s_N | ⋯ | g_{10}/s_N | V/s_N |

1706

1700

(c)

Guide Data   Video Data   Guide Data   Video Data   Guide Data   Video Data

| PID1 ⋯ PID10 | PID11 | PID1 ⋯ | PID11 | ⋯ | PID1 ⋯ | PID11 |

Slice 1   Slice 2   Slice N

PID Assignments of Intra-Coded Slices

1710

Figure 17

g₁/s₁ | V₂/s₂

g_1/s_1 | V_2/s_2

t_2

g_1/s_N | V_2/s_N

g_1/s_1 | V_{15}/s_1

t_{15}

g_1/s_N | V_{15}/s_N

1802

Scanning Video Slices
from left to right
Top to bottom

rl0 ll

V_2/s_1 | V_2/s_2 ... V_2/s_N ... V_{15}/s_1 | V_{15}/s_2 ... V_{15}/s_N

t_2 t_{15}

1804

rl0 ll

rl0 ll

Skipped
Guide
Slices

S_H/s_1 | S_k/s_2 ... S_k/s_N ... S_k/s_1 | S_k/s_2 ... S_k/s_N

t_2 t_{15}

1800

Video Slices | Skipped Guide Slices

rl0 ll 1806

Figure 8

START

INTRA-CODED SLICES 1710

| PID1 | PID2 | ... | PID10 | PID11 | AUDIO PID | PID11 | ... | PID11 | ... | PID11 | AUDIO PID | PID11 | AUDIO PID | PID11 | USER PID DATA | PID11 |

GUIDE   VIDEO 1902 AUDIO 1902   GUIDE   VIDEO 1902 AUDIO 1902   GUIDE   VIDEO   AUDIO 1902

END

PREDICTIVE-CODED SLICES 1906

| ... | PID11 | ... | PID11 | PID11 | ... | PID11 | PID1 | PID2 |

VIDEO   SKIPPED GUIDE DATA

Figure 19

Figure 10

2000

2002

2004

2008

2006

2100

Guide Portion	Video-1 (V)	— 2104
	Video-2 (J)	— 2106
	Video-3 (P)	— 2108

2102

FIGURE 21A

⇒ Guide
Data
Slices

9/S1	V/S1	1'st Video Slices
	V/SM	2nd Video Slices
	J/SM+1	
	J/EL	3'rd Video Slices
	P/SL+1	
J/3N	P/3N	

Figure 21B

PID1   PID2   PID10   PID11

$\boxed{g_1/s_1}$ $\boxed{g_2/s_1}$ $\cdots$ $\boxed{g_{10}/s_1}$ $\boxed{Y/s_1}$ ⎫

PID1   PID2   PID10   PID11

$\boxed{g_1/s_M}$ $\boxed{g_2/s_M}$ $\cdots$ $\boxed{g_{10}/s_M}$ $\boxed{Y/s_M}$ ⎭ Slices 1 to M ← 2202

PID1   PID2   PID10   PID12

$\boxed{g_1/s_{M+1}}$ $\boxed{g_2/s_{M+1}}$ $\cdots$ $\boxed{g_{10}/s_{M+1}}$ $\boxed{X/s_{M+1}}$ 2200

PID1   PID2   PID10   PID12

$\boxed{g_1/s_L}$ $\boxed{g_2/s_L}$ $\cdots$ $\boxed{g_{10}/s_L}$ $\boxed{J/s_L}$ Slices M+1 to L ← 2204

PID1   PID2   PID10   PID13

$\boxed{g_1/s_{L+1}}$ $\boxed{g_2/s_{L+1}}$ $\cdots$ $\boxed{g_{10}/s_{L+1}}$ $\boxed{P_1/s_{L+1}}$

PID1   PID2   PID10   PID13

$\boxed{g_1/s_N}$ $\boxed{g_2/s_N}$ $\cdots$ $\boxed{g_{10}/s_N}$ $\boxed{P_1/s_N}$ ⎭ Slices L+1 to N ← 2206

⇓

2210

PID1 $\cdots$ PID10 PID11 $\cdots$ PID1 $\cdots$ PID10 PID12 $\cdots$ PID2 $\cdots$ PID10 PID13   ← 2208

Slices 1 to M   Slices M+1 to L   Slices L+1 to N

Figure 22

$PID11$ $PID11$ $PID12$ $PID12$ $PID13$ $PID13$

V_2/S_1 ... V_2/S_M J_2/S_{M+1} ... J_2/S_L P_2/S_{L+1} ... P_2/S_N

V Slices   J Slices   P Slices

t_2

V_{15}/S_1 ... V_{15}/S_M J_{15}/S_{M+1} ... J_{15}/S_L P_{15}/S_{L+1} ... P_{15}/S_N

t_{15}

Predicted Video

2300

←2302

$PID11$ $PID11$ $PID12$ $PID12$ $PID13$ $PID13$

S_K/S_1 ... S_K/S_M S_K/S_{M+1} ... S_K/S_L S_K/S_{L+1} ... S_K/S_N →t_2

Skipped Guide Slices Vertically Corresponding to V Slices.   Skipped Guide Slices Vertically Corresponding to J Slices   Skipped Guide Slices Vertically Corresponding to P Slices

$PID11$ $PID11$ $PID12$ $PID12$ $PID13$

S_K/S_1 ... S_K/S_M S_K/S_{M+1} ... S_K/S_L S_K/S_{L+1} ... S_K/S_N →t_{15}

Skipped Guide Slices

←2304

2312   2308

2306   2310

Figure 23

Figure 24

START — 2505

WAIT FOR
DESIRED I-STREAM
PIDS — 2510

EXTRACT PACKETS
OF DESIRED
I-STREAM PIDS — 2515

COUPLE PAYLOAD'S
OF DESIRED I-STREAM
PACKETS TO VIDEO
DECODER — 2520

EXTRACT PACKETS
OF PREDICTED
PICTURE STREAM
PIDS — 2525

COUPLE PAYLOAD'S
OF PREDICTED
PICTURE STREAMS'
PACKETS TO VIDEO
DECODER — 2530

SELECT
DIFFERENT
I-STREAM
PIDS? — 2535   NO

YES

IDENTIFY PIDS
OF NEW DESIRED
I-SLICES — 2540

— 2500

Figure 25

START — 2605

WAIT FOR DESIRED I-STREAM PID — 2610

RE-MAP THE PID OF I-STREAM TO A PREDETERMINED PID* — 2615

RE-MAP THE PID OF PRED-STREAM TO PID* — 2620

EXTRACT PACKETS OF PID* STREAM — 2625

COUPLE PAYLOADS OF PID* STREAM TO VIDEO DECODER — 2630

SELECT A DIFFERENT I-PICTURE STREAM? — 2635

No

YES

IDENTIFY PID OF NEW DESIRED I-PICTURE — 2640

2600

Figure 26

START — 2705

WAIT FOR
DESIRED I-STREAM
PIOS — 2710

EXTRACT PACKETS
OF DESIRED
I-STREAM - PIOS
UNTIL
"0" SPLICE COUNTDOWN
PACKET (INCLUDING) — 2715

COUPLE PAYLOAD'S
OF DESIRED I-STREAM
PACKETS TO
VIDEO DECODER — 2720

RE-PROGRAM PID
FILTER TO RECEIVE
PRED - STREAM. — 2725

EXTRACT PACKETS
OF PRED - STREAM
UNTIL
"0" SPLICE COUNTDOWN
PACKET (INCLUDING) — 2730

COUPLE PAYLOAD'S
OF PRED - STREAM
PACKETS TO VIDEO
DECODER — 2735

SELECT
A DIFFERENT
I-PICTURE
STREAM
? — 2740

NO → RE-PROGRAM PID
FILTER TO RECEIVE
I - STREAM PID — 2750

YES

2745

IDENTIFY PID OF
NEW DESIRED
I-PICTURE

Figure 27

2700

Start

2801

Define Array with N PIDs

2802

Initialize Video PID hardware for N PIDs.

2804

Enable Hardware Splice

2810

2818

Splice Occurred at hardware register?

2812

Yes → Disable hardware splice

2814

→ Set the next slice video PID hardware to next entry in array

2816

No

2820 Wait for a predefined period of time

2822

2800

Figure 18

video transport
Stream-1 (PID 1)

912

video transport
Stream-2 (PID 2)

video transport
Stream-10
(PID 10)

audio transport
Stream
(audio PID)
2914

data transport
Stream-1
(PID 1)

data
transport
Stream-10
(PID 10)

Encoding and Packetizing unit 2902

Transport Stream Multiplexer and PMT assigner 2904

video sequence input 1-10

2906

audio
input
2908

data
input
2910

Final
transport
Stream(s)

2918

Apparatus 2900
Fig. 29

2916

video PID 1
audio PID
data PID 1

Program 1

3001

video PID 2
audio PID
data PID 2

Program 2

3002

. . .

| | |

video PID 10
audio PID
data PID 10

Program 10

3010

Single Transport, multiple Program

Program Assignment 3000

Fig. 30

Program   3102

Video   PID 1
video   PID 2
          '
          '
          '
    Video PID 10

    audio   PID

    data   PID 1
    data   PID 2
           '
           '

    data PID 10

Single Transport, Single Program
Program Assignment 3100
Fig. 31

video packets 3202

| video PID 1 | video PID 2 | ... | video PID 10 | ... |

audio packets 3204

| audio PID | audio PID | ... | audio PID | ... |

Data packets 3206

| data PID 1 | data PID 2 | ... | data PID 10 | ... |

Final transport stream 2918

video/audio packet group 3208

| ... | video PID 1 | ... | video PID 10 | audio PID | video PID 1 |

| ... | video PID 10 | audio PID | video PID 1 | video PID 10 | audio PID |

data packet group 3210

| ... | data PID 1 | ... | data PID 2 | data PID 10 |

Multiplexing into Single Transport

Fig. 32

Transport Stream 3
3306

Video PID 7
Video PID 8
Video PID 9
Video PID 10

audio PID

data PID 7
data PID 8
data PID 9
data PID 10

Transport Stream 2
3304

Video PID 4
Video PID 5
Video PID 6

audio PID
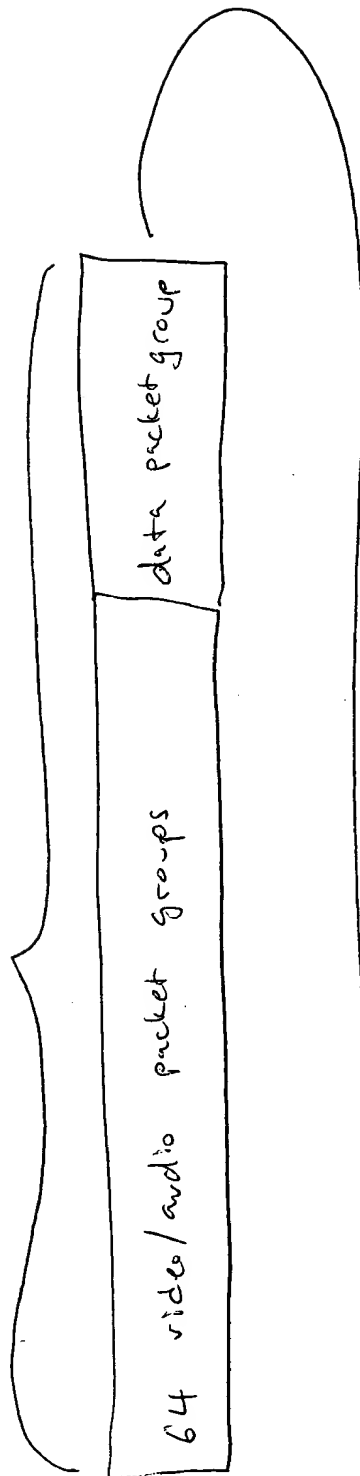
data PID 4
data PID 5
data PID 6

Transport Stream 1
3302

Video PID 1
Video PID 2
Video PID 3

audio PID

data PID 1
data PID 2
data PID 3

Multiple Transport
Assignment Structure 3300
Fig. 33

Intra-coded packets 3402

64 video/audio packet groups	data packet group

Predictive PID | Predictive PID | ' ' ' | Predictive PID

Predictive-coded packets 3404

Final Transport Stream 3400

Fig. 34

First Final Transport Stream 3502

Video/audio packet group 3509

PID 1	PID 2	PID 3	PID 1	PID 2	PID 3	PID 1	PID 2	PID 3	audio PID	PID 1	PID 2	PID 3	PID 1

Inter-coded packets 3508

PID 2	PID 3	PID 1	PID 2	PID 3	PID 1	PID 2	audio PID	...	data PID 1	data PID 2	data PID 3

Predictive-coded packets 3510

Predictive PID	Predictive PID	Predictive PID	...	Predictive PID

video/audio packet group 3513

PID 4	PID 5	PID 6	PID 4	PID 5	PID 6	PID 4	PID 5	PID 6	audio PID	PID 4	PID 5	PID 6	PID 4

Intra-coded packets 3512

PID 5	PID 6	PID 4	PID 5	PID 6	PID 4	PID 5	audio PID	...	data PID 4	data PID 5	data PID 5

Predictive-coded packets 3514

Predictive PID	Predictive PID	...	Predictive PID	Predictive PID

Second Final Transport Stream 3504

Fig. 35A

video/audio packet group 3517

Inter-coded packets 3516

Predictive-coded packets 3518
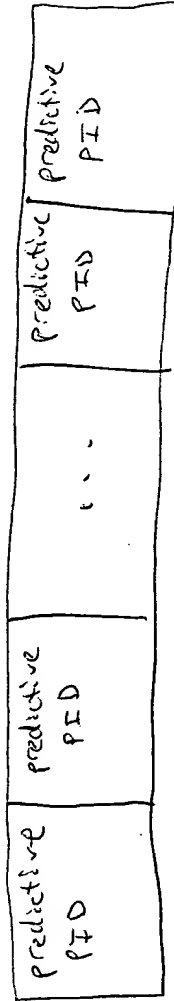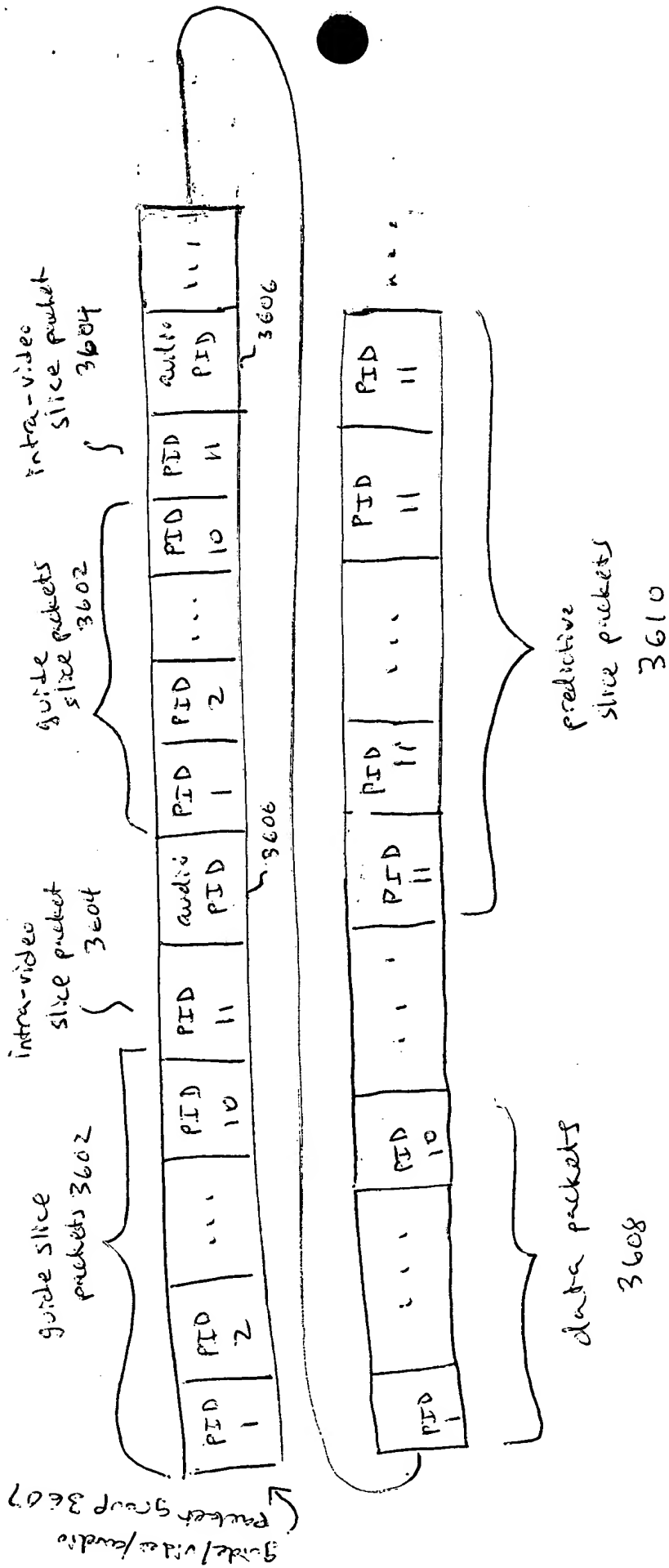
Third Final Transport Stream 3506

Fig. 35B

guide slice packets 3602

intra-video slice packet 3604

PID 1	PID 2	PID 10	PID 11	...

guide slice packets 3602

intra-video slice packet 3604

PID 1	audio PID	PID 2	...	PID 10	PID 11	audio PID	...

3606

3606

Guide/video/audio Packet Group 3607

data packets 3608

PID 1	PID 10	...

predictive slice packets 3610

PID 11	PID 11	...	PID 11	...	PID 11	PID 11

Final Transport Stream 3600

Fig. 36

First Transport Stream
3702

PID1	PID2	PID3	PID1	PID2	PID3	...

Second Transport Stream
3704

PID3	PID4	PID5	PID3	PID4	PID5	...

Fig. 37

First Transport Stream 3802

| PID 1 | PID 2 | PID 3 | PID 11 | audio PID | PID 1 | PID 2 | PID 3 | PID 11 | audio PID | ... |

| data PID | ... | PID 11 | PID 11 | PID 11 | ... |

Second Transport Stream 3804

| PID 3 | PID 4 | PID 5 | PID 11 | audio PID | PID 3 | PID 4 | PID 5 | PID 11 | audio PID | ... |

| data PID | PID 11 | PID 11 | ... |
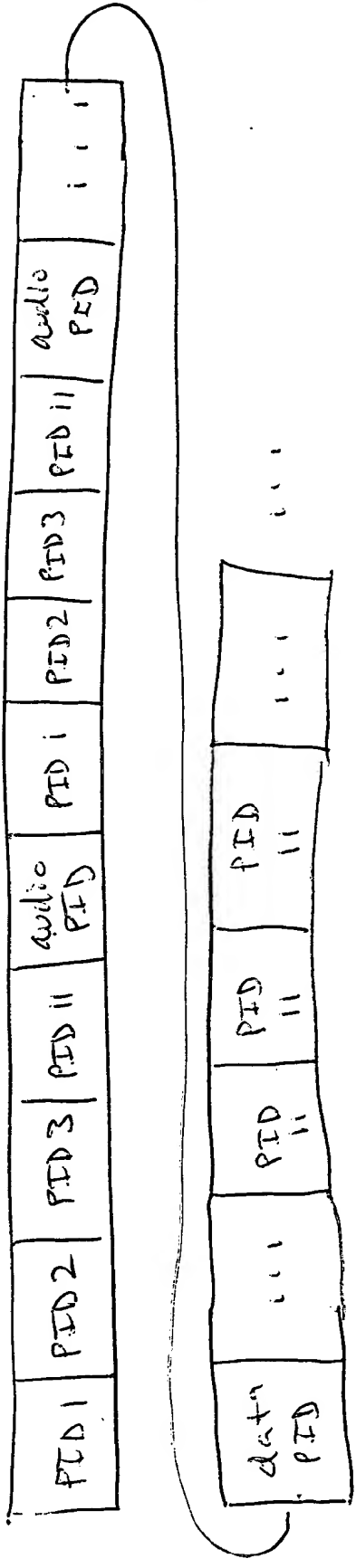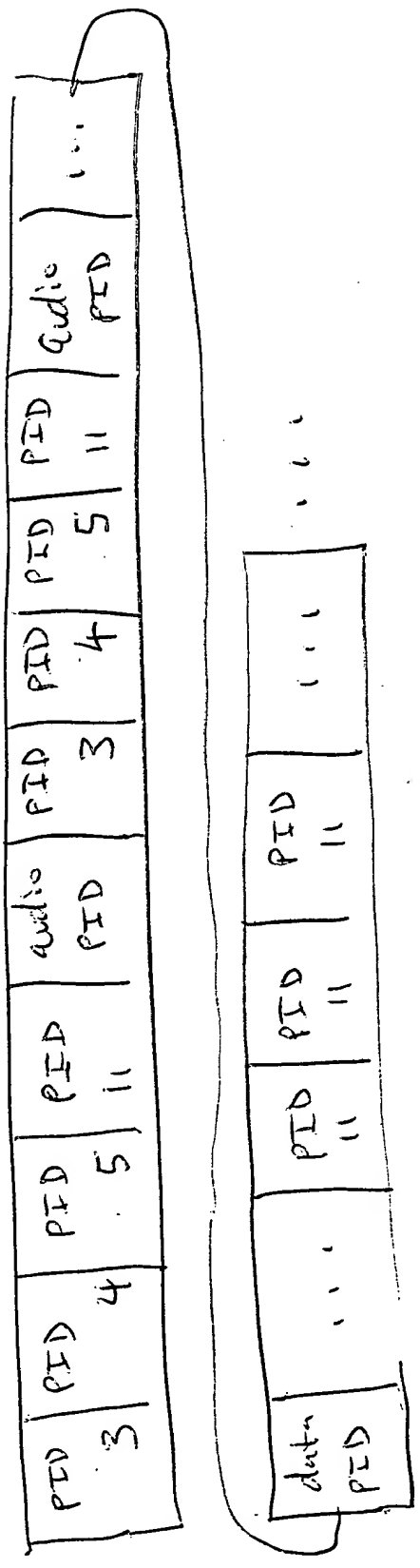
Fig. 38

Illustrative IPG Page

Video

Program Description

program guide

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Lower Threshold

Upper Threshold

Fig. 39

Reserved
by MPEG-2

30 video PIDs
audio PID
data PIDs

Current
Programming
4002

6720 video PIDs
audio PIDs

look ahead (2 weeks)
Video, audio
4004

128 data PIDs

lookahead (2 weeks)
data 4006

total
8190
PIDs

Reserved for
future use

Reserved by MPEG-2
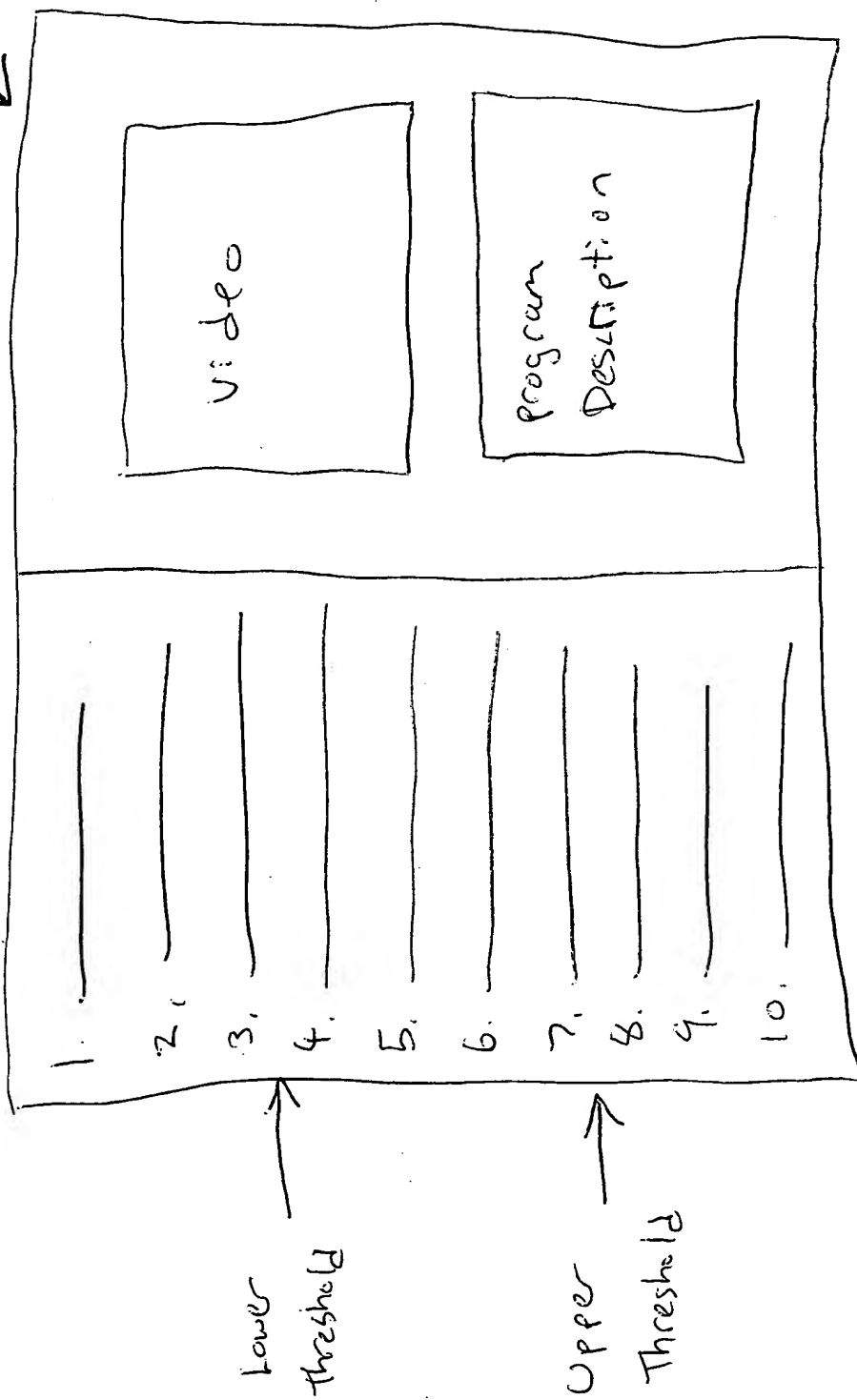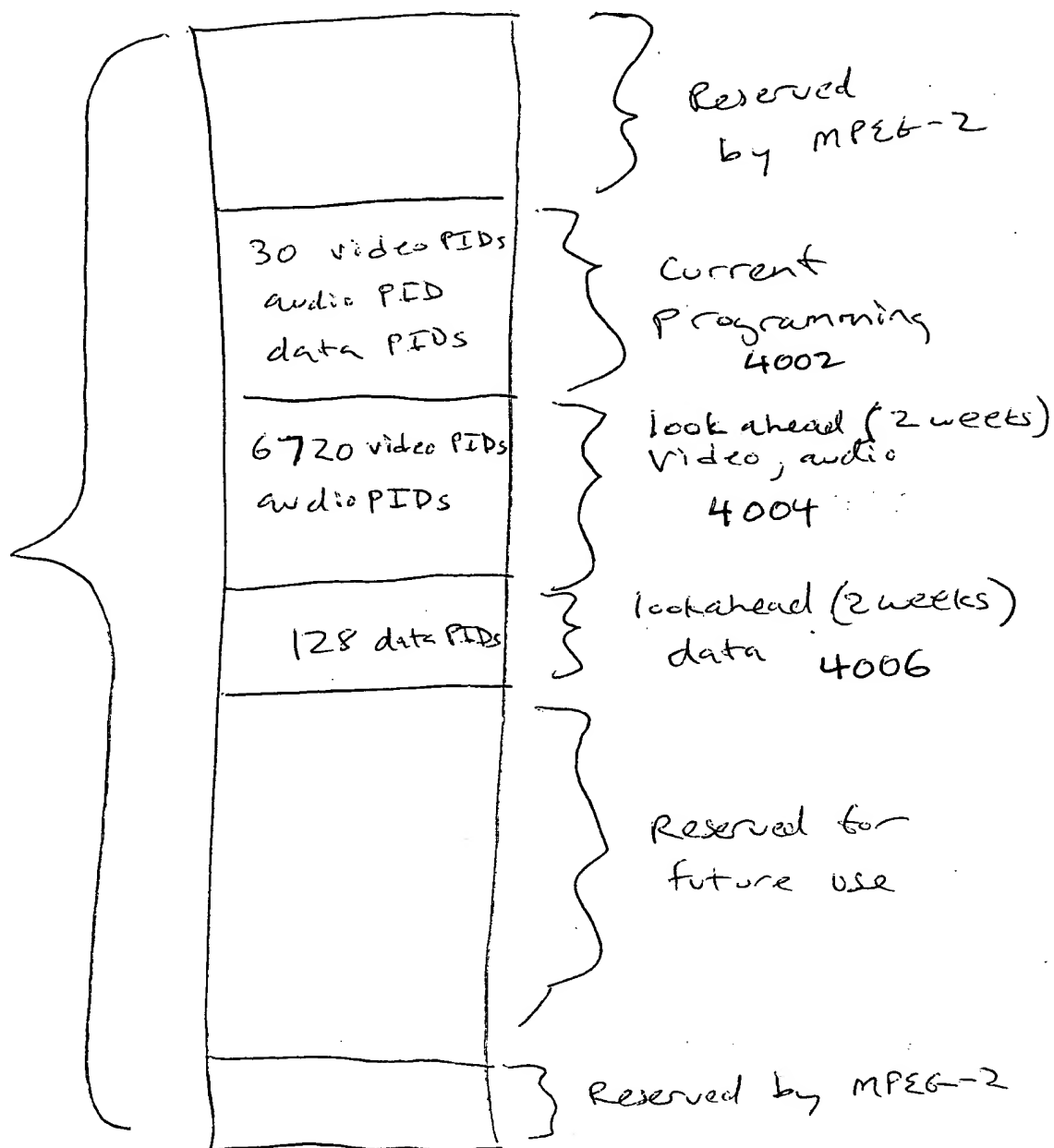
Fig. 40
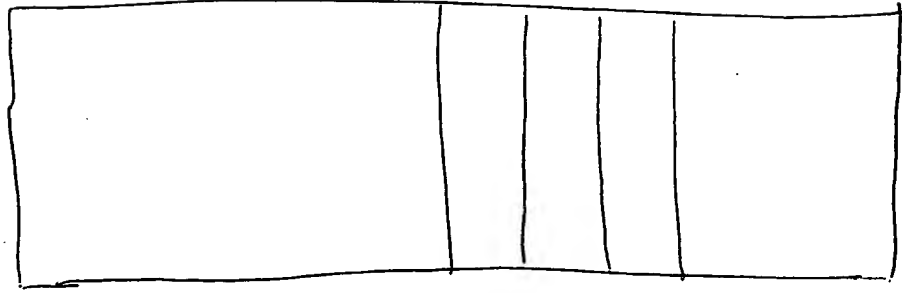
Time
00:00

17:00
18:30
20:00
21:30

23:59

Prime
Time
4102

(a)
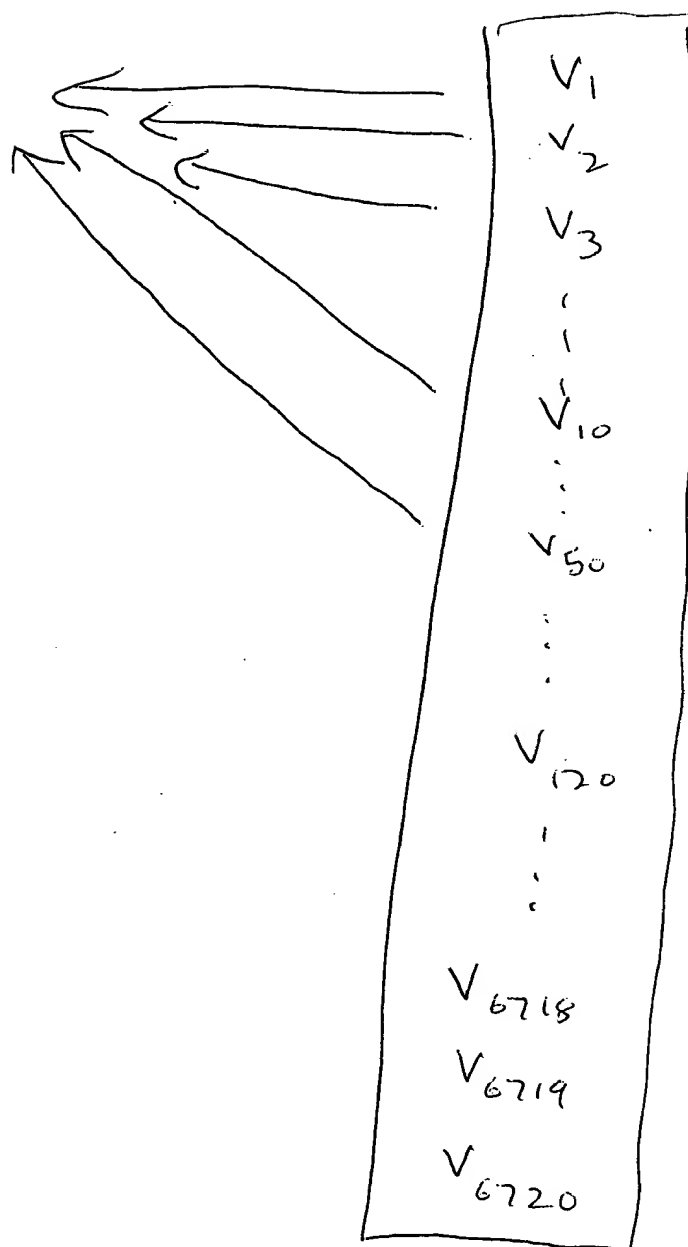
Time

1/2 hour shifts of a
current programmy timeslot

4104
17:00
18:30

4104
17:30
19:00

4104
18:00
19:30
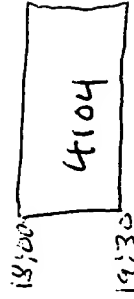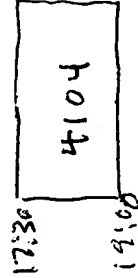
(b)

Fig. 41
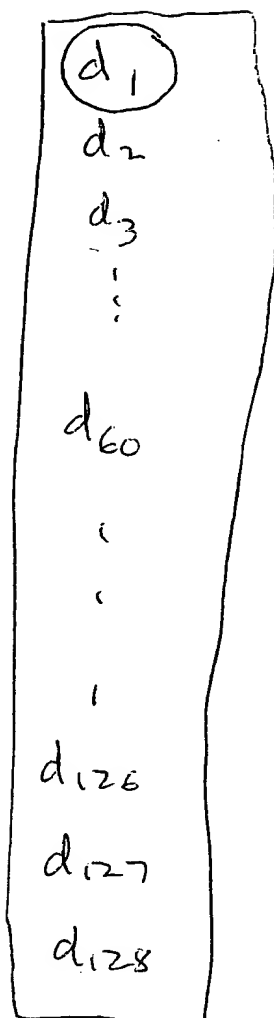
Lookahead
Data PIDs

Lookahead
Video PIDs

Fig. 42

Usage Time

prime time 4302

Mon Tues Wed Thus Fri Sat Sun

Time of week

Fig. 43

$d=1$

$t=1$ $t=2$ ... $t=16$

$d=2$

$t=1$ $t=2$ ... $t=16$

$d=14$

$t=1$ $t=2$ ... $t=16$

30 30 ... 30
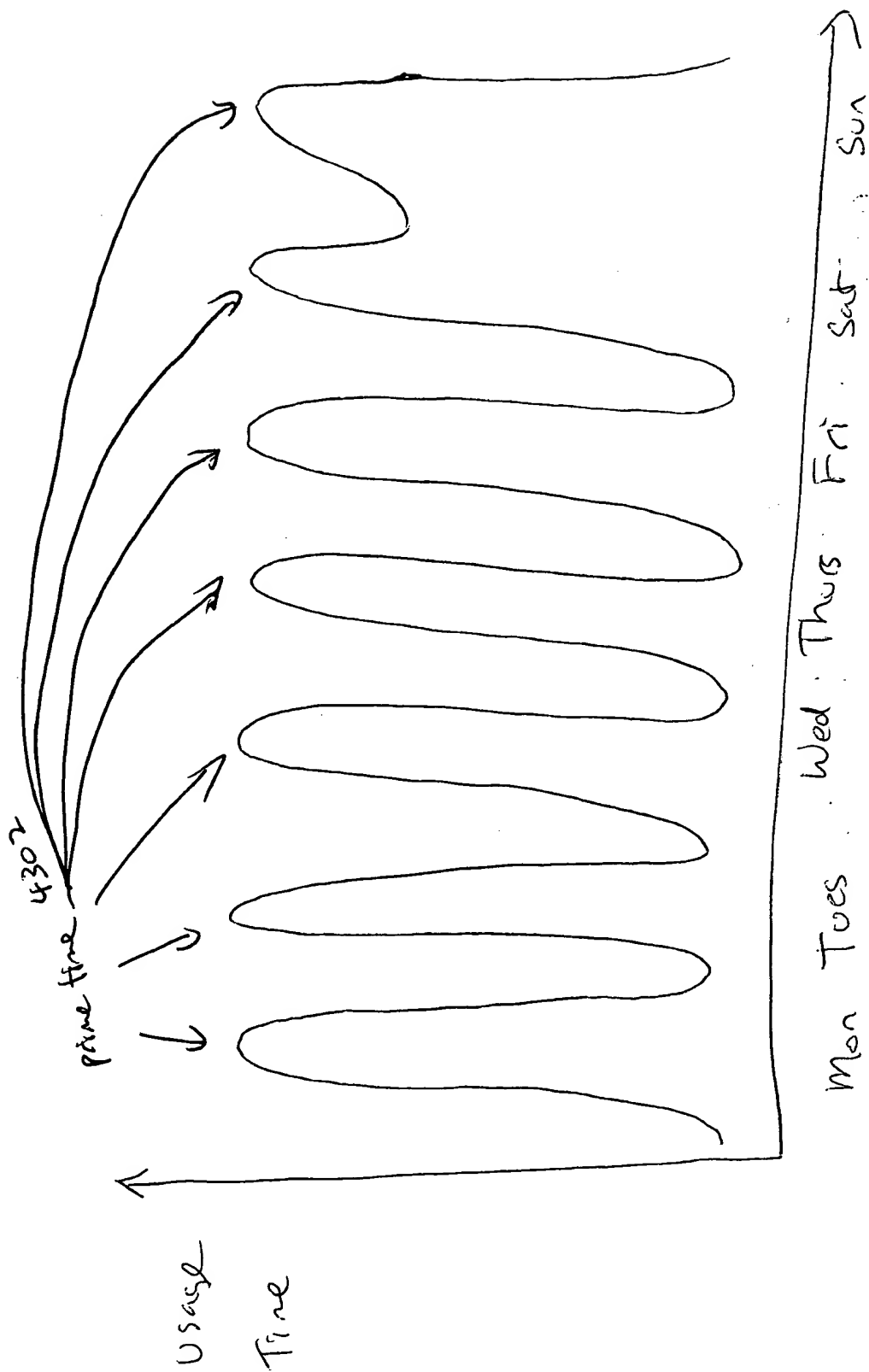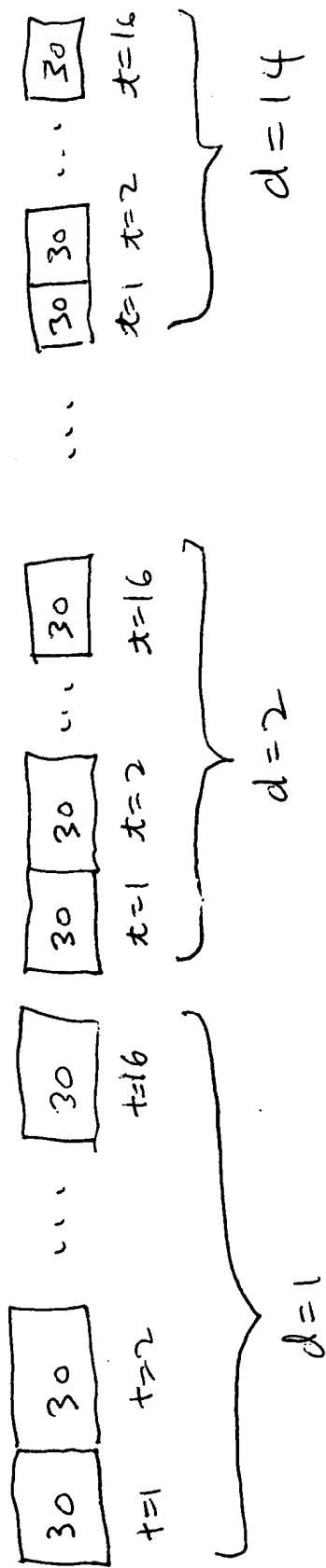
Fig. 44A

4400

largest prime # $\leq$ total # of data PIDs available

$$\Rightarrow$$

prime # = 127 $\leq$ 128

4422

data PID # = Video PID # (mod prime #)

= Video PID # (mod 127)

4424

4420

Fig. 44B

data PID
1

d d D d d d · · · ·

data PID
2

d d d d D · · · ·

data PID
127

d d d · · · D · · · ·
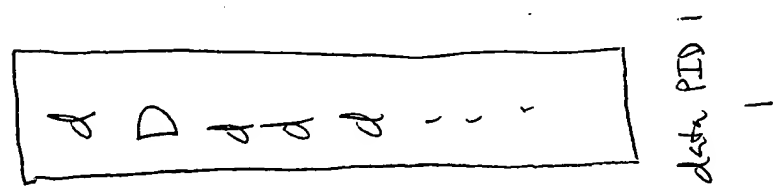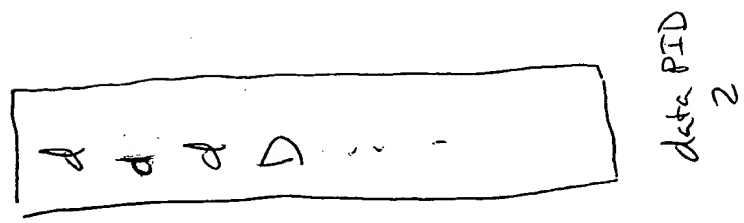
d = non-primitive data message

D = primitive data message

Fig. 44C